

REMARKS

Claims 1-50 are currently pending. In the Office Action dated October 14, 2005, claims 1-38 are rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,583,047 to Daniels et al. in view of U.S. Patent No. 6,051,321 to Lee et al. Claims 39-50 are withdrawn from prosecution.

First, applicants respectfully traverse the rejection of claim 1 as obvious over Daniels in view of Lee. Nevertheless, applicants herein amend claim 1 to recite an adhesion promoter layer formed from at least one material having a general structure of $(RZ)_x-Si-(W-T)_y$, wherein W is selected from -O-, -CH₂-, -(CH₂)_aC=OO-, and -(CH₂)_a-OO=C-; wherein T is selected from -CR=CR'R'', alkyl chlorides, alkyl bromides, alkyl iodides, and -RC=O; wherein Z is selected from O and NR; wherein R, R' and R'' are an H, alkyl or aromatic group; wherein a is 0 or an integer; wherein x = 1, 2 or 3; wherein y = 1, 2 or 3; and wherein x + y = 4.

Amended claim 1 is not obvious over Daniels in view of Lee for at least the reason that the combination of Daniels and Lee fails to disclose or suggest all of the elements of amended claim 1. For example, neither Daniels nor Lee discloses an adhesion promoter layer formed from at least one material having the general structure recited in amended claim 1. The adhesion promoter materials within the general formula recited in amended claim 1 are polymerizable by UV activation due to the presence of the "W-T" group in the general formula of claim 1. In contrast, the siloxane materials disclosed in Lee (*see*, for example, those listed at Lee, claim 13 and at col. 8, ll. 9-40) are not easily polymerized by UV activation. This is due at least to the fact that the recited polymers have only carbon-carbon, carbon-hydrogen and carbon-fluorine bonds, and do not have leaving groups that are easily and predictably removed from the precursor molecules by UV light. Instead, the siloxane precursors of Lee are polymerizable

primarily by plasma polymerization. The plasma polymerization process may be difficult to use to consistently remove a desired leaving group to form a predictable end polymer product. Instead, the plasma polymerization process may tend to cause unpredictable cross-linking, branching, and chain termination. Because Daniels and Lee fail to disclose or suggest all of the elements of amended claim 1, amended claim 1 is not obvious over the cited references, and is in condition for allowance. Furthermore, claims 2-15 depend from and include all of the elements of claim 1, and are therefore also in condition for allowance.

Next, applicants also respectfully traverse the rejection of claim 25 as obvious over Daniels in view of Lee. Nevertheless, applicants herein amend claim 25 to recite a first adhesion promoter layer formed from at least one material having a general structure of $(RZ)_x-Si-(W-T)_y$, wherein W is selected from -O-, -CH₂-, -(CH₂)_aC=OO-, and -(CH₂)_a-OO=C-; wherein T is selected from -CR=CR'R'', alkyl chlorides, alkyl bromides, alkyl iodides, and -RC=O; wherein Z is selected from O and NR; wherein R, R' and R'' are an H, alkyl or aromatic group; wherein a is 0 or an integer; wherein x = 1, 2 or 3; wherein y = 1, 2 or 3; and wherein x + y = 4. As described above for claim 1, the combination of Daniels and Lee fails to disclose or suggest an adhesion promoter layer formed from at least one material of this general formula. Therefore, amended claim 25 is not obvious over the cited references, and is in condition for allowance. Furthermore, claims 26-38 depend from and include all of the elements of amended claim 25, and are therefore also in condition for allowance.

Next, applicants respectfully traverse the rejection of claim 16 as obvious over Daniels in view of Lee. This is because the combination of Daniels and Lee fails to disclose or suggest all of the elements of claim 16. Claim 16 recites depositing a polymer dielectric film onto a substrate; depositing a hard mask layer over the polymer dielectric film; forming a patterned film

of a resist material on the hard mask layer; etching an etched feature into the composite polymer dielectric layer; annealing the etched feature in a reducing atmosphere including hydrogen; and depositing an electrically conductive material in the etched feature.

In contrast, neither Daniels nor Lee discloses at least the element annealing an etched feature in a reducing atmosphere including hydrogen. Daniels discloses annealing a via and trench in a controlled ambient, at col. 16, ll. 55-56. However, the controlled ambient is not disclosed as including hydrogen. Furthermore, Daniels also does not suggest annealing these features in a reducing atmosphere including hydrogen. The annealing process of Daniels is used to form a protective barrier layer by the modification of the surface layer of the walls and bottom of the via and trench by annealing. The purpose of the barrier layer is to protect the dielectric material in which the trench and via are formed from damage caused by a subsequent deposition of photoresist. In contrast, the reductive annealing process of claim 16 is to repair damage caused to a dielectric layer by an etching process. In other words, the annealing process is used to return the composite dielectric layer to its original, pre-etching chemical and physical form. See, for example, the specification of the present application at page 39, lines 16-18. The claim 16 annealing process thus solves a problem wholly different from the problem solved by the anneal process disclosed in Daniels. Therefore, for at least these reasons, Daniels fails to disclose or suggest all of the elements of claim 16.

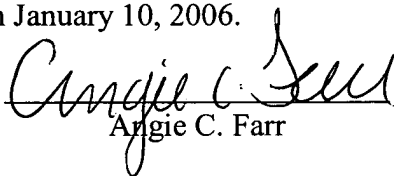
Likewise, Lee also fails to disclose or suggest annealing an etched feature in a reducing atmosphere including hydrogen. Lee discloses a post-deposition annealing process at col. 23, ll. 22-24. However, the annealing process is not disclosed as being performed in a reducing atmosphere including hydrogen. Furthermore, Lee does not disclose the annealing process as being performed after an etching process, and therefore does not suggest the need to repair

damage caused by the etching process, as contemplated by claim 16. Therefore for at least these reasons, the combination of Daniels and Lee fails to disclose all of the elements of claim 16, and claim 16 is allowable over the cited references. Furthermore, claims 17-24 depend from and include all of the elements of claim 16, and are therefore also allowable over the cited references.

Applicants believe that this application is now in condition for allowance, in view of the above amendments and remarks. Accordingly, Applicants respectfully request that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please contact the undersigned attorney of record.

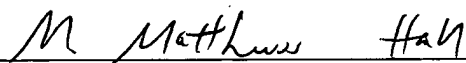
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